

ARKLOW HARBOUR.

FURTHER CORRESPONDENCE

RESPECTING

ARKLOW HARBOUR,

In continuation of C. 4678 and C. 4710.

Presented to both Houses of Parliament by Command of Her Majesty.



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FURTHER CORRESPONDENCE RESPECTING ARKLOW HARBOUR.

L.—LOCAL OBJECTIONS to PLANS proposed by BOARD OF WORKS in IRELAND, for the IMPROVEMENT of ARKLOW HARBOUR.

First Objection.—That it does not attain the greatest possible depth of water, and get out to or near the marl, with the shortest amount of extension.

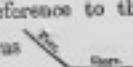
Proof.—Inasmuch as the proposed extension, instead of running out as directly, or as nearly at right-angles as practical from the shore, inclines several points to the N.E., thereby running more in a parallel direction with the north strand, and, as a matter of necessity, keeping in the sandy plateaux which lies immediately to the N.E. of the existing Harbour (see following soundings) :

SOUNDINGS from BROKEN END of SOUTH PIER.

BOARD'S PLAN, E. $\frac{1}{2}$ N.	Fath.		Distance, . . .	Fath.		LOCAL PLAN, E.S.E.
	Waters, . . .	Bottom, . . .		Waters, . . .	Bottom, . . .	
100	9		100	8		
300	12		300	12		
300	12		300	14		
400	13		400	16		
500	13½		500	18		
600	17		600	22		
700	19		700	27		

RECOMMENDED.—That the Piers be extended in an E.S.E. direction (see Local Plan), by which, with same amount of extension, an advantage of nearly five feet water over the Board's Plan will be gained in 500 feet.

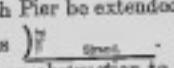
SECOND OBJECTION.—The direction of the Pier is a direct inducement to the shifting sand to follow it out to its extremity, and again silt up the Harbour.

Proof.—The compass bearing of the south extension with reference to the south strand forms one leg of an exceedingly large obtuse angle, thus  and as

the shifting sand is invariably brought from the south strand by the prevailing wind and sea, this break-off in the direction of the extension must serve as a direct inducement to the sand to again follow it out to its extremity.

Again, a most efficient safeguard against the sand is to extend to the Marl, of which the bottom at a certain distance from the shore is composed, and on which the sand has never been known to effect a lodgment.

Further,—The stronger the current of tide attained, the less danger of the sand forming a deposit. It is therefore submitted that the shortest and most direct course to the deep water must be the best.

RECOMMENDATION.—That the South Pier be extended so as to form more of an acute angle with the shore, say E.S.E., thus  This instead of facilitating the progress of the sand would present an obstruction to it, and keep it in the acute angle so formed.

THIRD OBJECTION.—The proposed Harbour will be impossible of access with the wind from the N.W. round by West to South, which are the prevailing winds for nine months out of the twelve.

Proof.—1st. It must be borne in mind that the flow of tide is so imperceptible at Arklow that, unlike every other Harbour in the United Kingdom, there is a constant current running out; and when there is a freshet, to which the Ovoca River is very subject, the current is of very great force, and has a velocity of, say, six knots per hour.

2nd. That, with the South Pier extending, say, 200 feet beyond the North, the moment the outgoing current loses the confining influence of the North Pier, it (the current) must break off round the short or north end of the Pier. It therefore follows that it is only with a fair wind, say from the South round by East, to N.W., and that of sufficient force to stem the current, that a vessel can attempt the Harbour. The

northerly set of the current also does away with its scouring power, and must allow any deposit carried down by the stream to accumulate at the South side, as at the present time.

But, suppose a vessel with a scant wind, say from the S.W., attempts to enter the Harbour—she rounds the South Pier, meets the wind ahead, gets within the influence of the outgoing current, which takes her in its direction on the port bow, and is inevitably carried either against the North Pier, or around it on the shore, and in either case lost. This was peculiarly the mistake with the old Piers, of which the proposed extension is a *foosmate*, so that whilst no boat or vessel has ever been lost on the South Pier, scores of boats, a number of vessels, and one life have been sacrificed on the North Pier; and very many more would have been lost but for the continuous assistance rendered by the inhabitants of the town.

RECOMMENDATION.—That the Piers be formed with a curve, and of equal length, and with the compass bearing before stated (E.S.E.) Then, no matter what way the wind blows, the vessel has a slant, and is able to fetch around either Piers according to circumstances. For instance, if the wind is from the S.W. she can round the South Pier, and fetch inside the curve of the North Pier, where, instead of being broken up as in the other case, she is in perfect safety.

FOURTH OBJECTION.—No safety in proposed Harbour in consequence of run.

PROOF.—With the wind blowing from the South, round by East, to North, the run between the straight and canal-like walls would be so great that the dangers of the open Roadstead would be much more easily contended against. We have seen old sailors at their wits' end to hold vessels in it; and remember one fine young man, a widow's son, drowned while attempting to do so during an easterly gale, which we find most destructive in our present Harbour.

RECOMMENDATION.—That the Piers be made in the curved direction, the opening to the sea being half the width of the greatest breadth across the area. This would to a large extent, do away with the run; and by utilizing the ends of the present broken Piers, i.e., giving them a steep strand fall, they would catch the remaining run, and leave smooth water in the inner or working harbour.

FIFTH OBJECTION.—Difficulty of egress with certain winds.

PROOF.—Completely open to the sea from E.S.E. to N.N.E., so that with the wind between these points, as it generally is in the months of March and April, the sea coming directly in, and the narrowness of the place vessels and boats would be impounded for weeks, whilst the most valuable portion of the oyster dredging season was passing over.

RECOMMENDATION.—This would be obviated by making the Piers on the Local Plan, as a vessel or boat could then be hauled down the North Pier, in smooth water to the very inside of the Head; she could then make sail, and fetch outside the South Pier.

SIXTH OBJECTION.—The North Pier being only a wash at high water.

PROOF.—That vessels or boats, except with a strong, fair wind (bearing in mind the set of the current), must of necessity fall against the submerged Pier; and having no means of either landing on it, or receiving assistance from the shore, both men and boats must be lost, as, even with westerly winds a very heavy sea frequently comes in.

RECOMMENDATION.—That the adoption of the Local Plan would effectually remedy this.

SEVENTH OBJECTION.—That owing to the form and direction of the existing Harbour (of which the Board's Plan is merely a continuation) even in its best state, with fourteen feet water and a fair wind, the fishing fleet on several occasions could not attempt it, and were forced, at great risk, to run somewhere else for shelter.

RECOMMENDATION.—That this would be remedied by Local Plan.

It is finally suggested, that if the Local Plan should be considered too expensive—even if there were no additional borrowing powers—the Committee representing local opinion, would prefer their own Plan, although with a shorter extension.

Signed,

JOHN STOKER, }
HUGH BYRNE, }

Arklow Harbour Committee.

II.—Objections of Local Committee, 1882.

1. The objections of the Arklow Committee to the Government Plan are that the direction of the Piers is carried too far north.

This direction increases the danger of the flow of sand to the N., and affords it facility.

2. That the N. Pier is not carried sufficiently far to sea.

Owing to this, when the wind is W. of South, the prevalent wind, no ship can fetch into it, the current always running out, and not as in nearly all other coast harbours of the United Kingdom, subject to changes of direction according to tide.

A N.E. sea would run up the Harbour in the full force.

3. To remedy this we recommend consideration of the following by rough sketch.

In this we change the line of direction of the Piers, from E. by N. nearly, to E.S.E. exactly.

This change of line is shown by the soundings to have the advantage of, at least, five feet more on entrance, and places the Pier head, if the same length on the marl, denuded of sand, at 700 feet in this direction; the bottom of the sea is hard marl, free of sand.

4. We also consider the N. Pier should be extended the same length as the S. Pier.

Our objections are, that in all winds W. of S. round to N.W., the entrance as given in the Plan will be inaccessible, and these are the most prevailing winds.

By extending the N. Pier to a line with the S., the entrance and exit of vessels would be greatly facilitated in all winds W. of S. to N.W.

In coming in, the wind being W. of S. to N.W., the current which is perpetually running out, takes the vessels on the port bow, and will not allow the helm to act, the consequence is, that vessels entering between the Piers as laid down in the Plan, are unable to clear the Pier head, and either wreck, or are carried on the sand to the N.

We have practical proof of this; the construction being very similar to the present mouth, in consequence many vessels have been wrecked, and lives lost on this particular point. We may mention in late years, the "Monitor," the "Charles Hudson," the "Sarah Jane," the "Martha Jane," Schooners; the "Adelaide French," Brigantine, and many others.

To save the proved danger we would recommend the Piers being made concave inside as in rough sketch. This would allow a vessel to fetch round the Pier Head into the Pier safely.

We admit that in southerly winds the position of the mouth we recommend would bring a heavier sea into the Harbour, but this we could remedy first by widening the space between the Piers, thus allowing the wave to expand, and also by putting groins about the position of the old Pier Heads it might be possible to utilize them as groins.

III.—REPLIES to Objections furnished by Colonel TOWN.

1. Every point towards the south lessens the protection of the North Coast and exposes the mouth of the Harbour to the S.E. gales, diminishing the protection under the breakwater, the length 700 feet to which it is proposed to carry the South Pier, places the head nearly on the denuded marl, and the admitted constant stream out of the river should tend to keep the entrance clear of sand.

2. The North Pier is rightly of a considerably less length than the South Pier, being a Breakwater not an entrance Pier. Ships coming in on the winds mentioned would tack round the head of the breakwater and anchor in shelter in smooth water, they could haul into the Harbour at their convenience afterwards. It is, therefore, not the case that the proposed Harbour of Arklow would be useless, as stated.

3. The direction recommended would expose the river far more than at present to gales from the south; every point to which the direction of the Breakwater can be carried north, provided it allows sufficient water and room to the north for tacking under the shelter of the Breakwater, increases the shelter. The soundings and plan show that sufficient water and room is given in the Government plan.

4. This would simply leave the entrance of the Harbour in the same dangerous condition as at present, the admitted cause of wreck being the difficulty in stormy

weather (the wind being W. of S.) of weathering the point of the North Pier: ships being consequently driven either on the Pier or on to the strand to the north. The remedy for this in the Government plan is thus very extension of the South Pier to act as a breakwater, under which, in the conditions alluded to, vessels could anchor in perfect shelter.

There is only a certain sum of money to be spent. The recommendations made by certain Members of the Committee would, if carried out, require a reduction in the length of the South Pier in proportion to the increase on the north, and the radius of the curve recommended.

The taking the head of the North Pier out of the shelter of the Breakwater would require a far more expensive construction for the North Pier, and ships would have to make a dead beat into the Harbour, instead of merely tacking into the lee of the Breakwater.

Taking 200 feet perhaps off the Breakwater would completely change the nature of the work, and reduce the protection. The Committee do not appear to have sufficiently understood that the main feature of the present scheme is protection by a Breakwater to the entrance, the want of which, according to their own showing, has been the cause of so many wrecks.

IV.—CONTRACT for the CONSTRUCTION of the HARBOUR.

ARTICLES OF AGREEMENT, made, concluded, and agreed upon this Fifteenth day of December, in the year of Our Lord, One Thousand Eight Hundred and Eighty-two, BETWEEN Kenneth MacDonald, of Fairlie, Greenock, and Craigievar, Saltcoats, Ayrshire, "Contractor," of the one part, and Colonel John Graham M'Kerlie, C.B., and William Richard LeFanu, and Samuel Usher Roberts, Esquires, Civil Engineers, being the Commissioners of Public Works in Ireland, hereinafter called "The Commissioners," of the other part. WHEREAS the said Commissioners did heretofore signify their intention of executing, completing, and finishing the Works hereinafter particularly mentioned and described. And Whereas the said Contractor hath proposed to execute, complete, and finish the said Works in the manner, within the period, upon the terms and conditions, and according to the plans, sections, and specification, description, or particulars, hereinafter mentioned and referred to, and to which proposal the said Commissioners have consented and agreed. Now THAT THESE WITNESSES, that in pursuance of the said Proposal and Agreement, and for and in consideration of Five Shillings to him the said Contractor in hand paid by the said Commissioners, at or before the execution of these Presents (the receipt whereof is hereby acknowledged), and also of the further sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds Sterling, to be paid to the said Contractor, his Executors and Administrators, as hereinafter mentioned, he the said Contractor doth hereby for himself, his Heirs, Executors, and Administrators, covenant, promise, contract, and agree with and to the said Commissioners, their Successors and Assigns, that he the said Contractor, his Executors or Administrators, shall and will at his and their own proper costs, charges, and expenses, forthwith begin, and in an expeditious and workmanlike and substantial manner, execute, complete, and finish Arklow Harbour, in the County of Wicklow, together with the several and respective works connected therewith, as respectively shown by, or to be inferred from the plans and sections, and the specification, description, or particulars thereof, and according to the terms and conditions respectively (which said plans, sections, specification, description, or particulars, terms, and conditions, signed by the said Contractor, it is hereby agreed shall be respectively considered as part hereof), in such manner and within such time as hereinafter expressed and limited, and conformably to and in strict accordance with the said plans, sections, specification, description, and particulars, and that he the said Contractor, his Executors and Administrators, at his and their like expense, shall and will do, perform and execute, or cause and procure to be done, performed and executed, in a good, proper, sound, substantial, and workmanlike manner, and in every respect agreeably to the directions and approbation of the Engineer, to be from time to time appointed by the said Commissioners or their Successors, being such Commissioners for the time being, all such works, matters, and things, in and about the said Works, hereinbefore particularly mentioned and described, as shall be by such Engineer from time to time deemed or considered necessary or proper in relation thereto, and shall and will at his and their own like costs, charges, and expenses, find and provide all and all manner of materials and things, and all tools and utensils, scaffoldings, center-

ings, apparatus, implements, workmanship, and other matters whatsoever, necessary and sufficient, and which can, shall, or may be required to be used done, and provided, in and about the said Works, and shall and will in all respects complete and finish the same, on the Thirty-first day of August, One Thousand Eight Hundred and Eighty-five, in all things agreeably to the said plans and sections, so signed by the said Contractor as aforesaid, and the said specification, description, or particulars, terms and conditions. And the said Contractor doth hereby declare and agree, that he, his Heirs, Executors, and Administrators, shall be accountable for the full performance of this Contract, and by the signing hereof he doth admit that the said plans, sections, specification, description, or particulars, are sufficient to and for their intended purposes respectively, and that without any extra or additional work other than the Works set forth thereby or necessarily or reasonably inferred to be done from the general nature and tendency of the same plans, sections, specification, description, or particulars, and that the said Works hereinbefore particularly mentioned and described and the several Works connected therewith, shall be done, executed, completed, and finished, to the entire satisfaction of such engineer as aforesaid, according to the true intent and meaning of said specification, description, or particulars, terms, and conditions (upon every sentence whereof a fair and liberal construction shall be made in favour of the said Commissioners and their Successors,) in manner as aforesaid. And it is hereby agreed by and between the parties hereto, that if any materials, implements, matters, or things, shall be used in or supplied for the Works hereby contracted for, which shall not be approved of by the said Engineer, he the said Contractor, his Executors, and Administrators, shall take them away at his and their own expense, and at his and their own like expense provide such other materials, implements, matters, and things in lieu thereof, as the said Engineer shall direct and approve of. Provided always and it is hereby agreed by and between the parties hereto, that in case of any difference between the said Commissioners or their Successors, in manner as aforesaid, and the said Contractor in relation to any of the Works, matters, and things herein contracted for, or to the meaning of these presents, or of any part thereof, or to the said plans, sections, specification, description, or particulars, or to any act, matter, or thing done or omitted to be done by either of the parties hereto, under or by virtue of any of the provisos, covenants, or stipulations of these presents, and whether such difference shall relate to any act done by the said Commissioners or their Successors, for the purpose of determining this contract under the powers hereinafter contained or otherwise, in any manner in relation to such powers, then and in every such case the same shall be referred to such Engineer as the said Commissioners, and their Successors may for that purpose appoint, whose decision shall be final, binding, and conclusive upon the parties hereto, and the expense of such reference and decision shall be paid and borne by the party or persons against whom such decision shall be made. And he the said Contractor, doth hereby covenant and agree for himself, his Heirs, Executors, and Administrators, to and with the said Commissioners, their Successors and Assigns, that in case the said Works hereinbefore particularly mentioned and described, and the several other Works connected therewith, hereby contracted for, or intended so to be, shall not be commenced on or before the Twenty-ninth instant, he the said Contractor, his Heirs, Executors, or Administrators, shall and will pay to the said Commissioners, and their Successors as aforesaid, as and for assessed and ascertained damages incurred by such default, the sum of Five Pounds per day for every subsequent day until the said Works hereinbefore mentioned shall be so commenced, and if the said Works so to be, shall not be made, completed and finished on the day for that purpose hereinbefore appointed, he the said Contractor, his Heirs, Executors, or Administrators, shall and will pay to the said Commissioners, and their Successors as aforesaid, as and for Assessed and ascertained Damages, incurred by such default, the sum of Five Pounds per Day for every subsequent Day until the said Works hereinbefore particularly mentioned and described, and the several other Works connected therewith, shall be so completed. And it is hereby further agreed and declared by and between the parties hereto, that all materials brought to and delivered upon the site of the said intended Works, or upon any other lands, grounds, or premises, for the purpose of the said Works, shall from the time of their having been so brought, be considered the property of the said Commissioners and their Successors as aforesaid, and shall not on any account, nor under any pretence whatsoever be taken away from off said Premises by the said Contractor, his Executors or Administrators, or any other person or persons whomsoever, unless by the special consent and authority (signified in writing) of the said Commissioners and their Successors as aforesaid, first had and obtained. And it is hereby agreed between the parties to these Presents, and the said Contractor doth hereby for himself, his Heirs, Executors, and Administrators, covenant and agree with

the said Commissioners, their Successors and Assigns, that in case he the said Contractor shall not commence the said Works within fourteen days after the date of this Contract, or shall discontinue the progress of said Works for the period of one continuous fortnight, or shall not proceed therewith with such diligence and expedition, and in such manner in all respects as shall be satisfactory to the said Commissioners and their successors, as aforesaid (of which diligence and expedition they the said Commissioners and their Successors as aforesaid shall exclusively be judges), then, and in either or in any such case, the said Commissioners and their Successors as aforesaid, shall and may, if they think proper so to do, have power, after seven days' notice in writing of their intention so to do, given to the said Contractor, his Executors or Administrators, or delivered at his or their then last place of Residence, to cause the said Works hereby contracted for to be proceeded with, by themselves the said Commissioners and their Successors as aforesaid, in such manner and by such person or persons as they shall think proper, and for that purpose to enter upon, seize, and take possession of the said Works hereby contracted for, and all materials, engines, machinery, implements, and utensils provided by the said Contractor, his Executors or Administrators, for the execution of the said Works, and to use and apply the same materials, engines, machinery, implements, and utensils, in and for the purpose of the completion of the said Works, and also to employ such Contractor or Workmen, and to provide all such further and other materials, matters, and things, and do and execute all works which the said Commissioners shall consider proper for the purpose of completing such Works, and the certificate of the Engineer of the said Commissioners of the amount expended by them in the completion of such Works shall be binding and conclusive on all parties as to the amount and propriety of such expenditure, and the amount so certified to have been expended by the said Commissioners as aforesaid, it is hereby agreed shall be repaid to them by the said Contractor, and in case the said Commissioners and their Successors, as aforesaid, shall expend in or towards the completion of the said Works, hereby contracted for, any sum or sums of money exceeding such balance (if any) of said sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds as may then remain in the hands of the said Commissioners and their Successors, as aforesaid, he, the said Contractor, doth hereby for himself, his Heirs, Executors, and Administrators, covenant, promise, and agree to and with the said Commissioners, their Successors and Assigns, that he, the said Contractor, or his Heirs, Executors, or Administrators, shall and will pay the amount of such difference to the said Commissioners and their Successors as aforesaid. And in case the said Commissioners, in completing the said Works, shall use or cause to be used any plant or materials of the said Contractor, or in case, at the time when the Commissioners shall so take possession of the said Works as aforesaid, any work shall have been done by the said Contractor for which he shall not then have been paid by the said Commissioners, it is hereby agreed that the said Contractor shall, on completion of the said Works, but not sooner, be entitled to receive or be allowed in account, as the case may be, in respect of such last mentioned work or of such plant or materials, such sum of money only as the Engineer for the time being of the said Commissioners shall in writing under his hand certify to be the value of such work or the value of such plant and materials as aforesaid. And the said Contractor doth hereby for himself, his Heirs, Executors, and Administrators, covenant, promise, and agree with and to the said Commissioners, their Executors, Administrators, and Assigns, that he the said Contractor, his Executors, or Administrators, shall and will well and truly from time to time and at all times pay, or cause to be paid to the Workmen and Labourers who may from time to time be employed in and about the said Works all wages or sums of money which to such Workmen and Labourers shall be respectively due and payable, and that in no instance shall the said Contractor, his Executors and Administrators, allow more than One Month's Wages to be in arrear and unpaid to any person or persons employed or to be employed in or about the said Works, hereby contracted for, or any part thereof.

PROVIDED ALWATS, and it is hereby declared and agreed by and between the parties hereto, that if the said Commissioners and their Successors as aforesaid, shall, during the progress of the said Works hereby contracted for, or any of them, direct or require, by written notice, any deviation, alteration, or variation to be made in the construction, erection, execution, or formation, or in the substance or form of any of the said Works hereby contracted to be made or done, or of any part thereof, or deem it proper or expedient to substitute other Works, Materials, matters, and things differing from or in lieu of those already agreed for as aforesaid, or which shall have been adopted or given by the said Commissioners and their Successors as aforesaid, for the time being, such deviation, alteration, variation, or substitution shall be considered as affecting only the specific object in view and therein specified, and shall not

in anywise vitiate, open, or otherwise affect the Contract hereby made, except so far as the same may increase or diminish the quantity or quality of work, labour, or materials, done, used, or expended in and about the said Works hereby contracted for, but such deviations, alterations, and substitutions, materials, or Works shall be performed, completed, and provided by the said Contractor, his Executors and Administrators, in the same way and manner, and within the same time (unless the said Commissioners and their Successors as aforesaid, shall think an extension of time reasonable) as the Works by these Presents covenanted and agreed to be done, performed, and executed, and as if such alterations, variations, deviations, and substitutions had been originally provided, adopted, and decided upon and approved by the said Commissioners, and for any increase or diminution in the Works, quantity or quality of labour and change in materials to be made, done, used, and expended as aforesaid, an allowance shall be made in case it shall appear to the said Commissioners and their Successors as aforesaid, that any such deviation, alteration, substitution, or variation is of sufficient importance to require same, such allowance to be made either in favour of or against the said Contractor, his Executors or Administrators, as the case may require, and the amount of such increase, diminution, or variation shall, before the commencement of such change in said Works or materials, be regulated, adjudged, fixed, and determined by the Engineer for the time being of the said Commissioners and their Successors as aforesaid, having reference to the rate at which the entire Works hereby contracted for have been undertaken to be performed, and the Schedule of prices of the said Contractor in reference thereto, hereto annexed, as far as the same can be considered applicable thereto, and in case the same is not applicable thereto, then the same shall be determined by the Engineer of the said Commissioners, but subject in all such cases to the appeal by the Contractor to the Engineer to be appointed Referee as aforesaid. Should the Contractor be dissatisfied with what may have been regulated, adjudged, fixed, or determined by the Engineer for the time being as above set forth. And it is further hereby agreed that in no case shall the Contractor be entitled to be paid or allowed by the said Commissioners any sum whatever for any work done by him extra the Works in the said Plans and Specifications mentioned or referred to, nor for any materials in respect of such extra work, unless the said Commissioners, or one of them, or their Secretary for the time being, shall in writing, signed by them or him, have directed such extra work to be done, and the said Contractor shall in respect of such extra work and materials for the same be entitled to be paid or allowed in account such sum of money only as the said Engineer shall in writing under his hand certify to be the value of such extra work and materials. And it is hereby further agreed by and between the parties hereto, that the said Commissioners and their Successors shall be at liberty to deduct from the sum payable by them under this Contract, or from any part thereof which may remain unpaid, and pay themselves and retain to their own use, all sum and sums of money which may become payable to them under the conditions and agreements hereinbefore contained, or any of them. And it is hereby further agreed by and between the parties hereto, that the said Commissioners shall, at any time within the time hereinafter provided, for the final payment on foot of this Contract, be authorized to require the Contractor (notwithstanding any previous Certificate of their Engineer), at his own costs, to remove and replace any defective workmanship and materials which may be discovered, and to make good any omission not previously perceived or discovered, as well as remedy any defects resulting therefrom; and should the Contractor refuse or delay to remedy such omissions, or make good such defects, within such time as the said Commissioners may appoint for that purpose, it is hereby further agreed that the said Commissioners shall be at liberty to do so, and deduct and retain the expenses thereof out of any moneys which may be due to the Contractor on foot of this Contract. And these presents further Witness that in consideration of the Premises, and of the due performance thereof by the said Contractor, his Executors, or Administrators, they the said Commissioners do hereby, for themselves and their Successors as aforesaid, covenant, promise, and agree with and to the said Contractor, his Executors and Administrators, that they the said Commissioners, or their Successors as aforesaid, shall and will well and truly pay or cause to be paid unto the said Contractor, his Executors, and Administrators, the said sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds, at the time and in the manner hereafter mentioned, that is to say, the sum of Eighty Pounds per cent, on the amount which the Engineer for the time being of the said Commissioners shall, on the application and certificate of the said Contractor in the form prescribed by the said Commissioners, from time to time certify as the value of the work done and executed on foot of this Contract, until Three Thousand Pounds shall have been thus retained, and thereafter the full amount certified by the Engineer, as aforesaid, shall be paid the Contractor. It being hereby agreed that the aforesaid

deductions of Twenty Pounds per cent. are to remain in the said Commissioners' hands for the period hereinafter mentioned, as part security for the due performance of this Contract, such Engineer in giving such certificates, having at all times due regard to the completion of the entire of said Works hereby contracted for, at and for the said price or sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds, and that he shall not be obliged at any time to give any such certificate unless satisfied that a balance of the said sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds remains unpaid, sufficient to complete the said Works, within the time hereinbefore limited, and provided that no payment shall be demanded or required at any one time, for a less sum than a sum of Eight Hundred Pounds, but nothing shall prevent, or be deemed or construed to prevent, said Commissioners from making payments in a less amount, if they shall at any time think fit so to do, and the remainder of said sum of Twenty-five Thousand Six Hundred and Fifty-one Pounds to be paid within one calendar month after the several Works hereby contracted and agreed for shall have been fully completed and finished to the satisfaction of the Engineer of said Commissioners and their Successors, Commissioners, and a certificate to that effect, as well as to the effect that the several conditions and agreements herein contained, on the part of the said Contractor, his Executors and Administrators, have been fully performed and kept, shall have been obtained from such Architect. PROVIDED ALWAYS, and it is hereby declared and agreed by and between the parties hereto, that nothing herein contained shall in any manner affect, charge, or encumber, or be construed, deemed, or taken to affect, charge, or encumber the persons of the said Commissioners, or their Successors as aforesaid, or their or any of their estates, real or personal, they having joined in and executed these Presents as such Commissioners as aforesaid, and not for the purpose of affecting or binding themselves individually, and having personally no interest whatever herein. IN WITNESS whereof, the said Contractor has hereunto subscribed his name and affixed his seal, and the said Commissioners have hereunto subscribed their names and affixed their seals the day and year first above written.

KENNETH MACDONALD.

Signed, Sealed, and Delivered by the said

(Signed), K. MACDONALD.

KENNETH MACDONALD,

in presence of

(Signed), Wm. RUSSELL KELLY, Solicitor.

V.—RESOLUTION.—COUNTY WICKLOW GRAND JURY, SPRING, 1885.

RESOLVED.—That this Grand Jury being compelled to pass the presentments asked in favour of the Commissioners of Public Works, by way of repayment upon the loan advanced by them for the reconstruction of Arklow Harbour, and having been informed that the money obtained under said loan has been expended under the directions of the said Commissioners, notwithstanding the protest of the cess-payers, so as to have been perfectly lost, and rendered useless to the county, and to the cess-payers.

We hereby request the Government to have an early inspection made of these works at Arklow Harbour, by some independent engineer, with the view of relieving the cess-payers of a useless expenditure.

That a copy of this resolution be forwarded to the Chief Secretary for Ireland and the Commissioners of Public Works.

(Signed), CHARLES GEORGE TOTTENHAM, Foreman.

A true copy.

(Signed), E. WINNE, Secretary to Grand Jury.

VI.—ARKLOW HARBOUR WORKS.

Report by Mr. W. G. Strype, Civil Engineer, Wicklow, addressed to W. J. Corbet, Esq., M.P., House of Commons.

1. Sir—I received instructions from a Committee, composed of a number of the townspeople in Arklow and others locally interested, to make an inspection of the Harbour Works, in order to report to you upon the injury the Breakwater has received, and also to remark upon the report of the Engineer to the Commissioners of Public Works in

Ireland upon its condition. Accordingly I visited Arklow on Saturday last, the 9th instant, and made a careful inspection of the damaged Pier, and now beg to submit, for your consideration, the following report:—

2. In order to set forth the matter more fully, I have attached to this report three Appendices to illustrate the state of the works. In Appendix No. 1,* I have shown the foreshore upon the longitudinal section of the Pier, and marked the extent to which the works have been already carried out, and where the timber staging for the remaining portion is situated. The total length of this Pier was intended to be 700 feet, and it has been carried out, as stated in Mr. Manning's Report, for 458 feet; this total length of 700 feet, however, includes a shore-end length of 125 feet of comparatively inexpensive structure, so that the total length of the more costly work should be put down at 575 feet. Of this portion, 333 feet has therefore only been executed, and there remains 242 feet to complete it; but as the section deepens and widens, in a way that will be obvious, as the Pier progresses and is laid in deeper water, its cost per foot-run naturally increases. I would therefore consider that owing to the greater volume of work required to form the remaining 242 feet, that up to the present time only about one-half of this Pier has been laid; while the northern Pier (which is intended to have a total length of 425 feet) has not yet been touched. However, there has been prepared close to the works, upon the shore, a large pile of very fine concrete blocks ready to be laid, and the necessary timber staging with cranes, and appliances for laying these blocks have also been fixed. It appears the contract plans were issued by the Board of Works in August, 1882, for the purpose of obtaining tenders, and it was stipulated the whole of the works should be completed by the 31st of this month.

3. On Appendix No. 2,† I have shown a section of the Breakwater as it was designed, but a few changes have been made in it; these were chiefly that the Contractor employed heavier concrete blocks where blocks were shown, and substituted blocks for concrete in situ at the inside of the storm wall below the level of L. W. It will be seen that the design is that of a compound structure, consisting of two comparatively thin walls (the outer, or storm wall, being only $19\frac{1}{2}$ feet at the base) placed at some distance apart, with loose rubble hearting between. Under the level of L. W. these two walls are composed of concrete blocks which were raised up over this level by concrete laid in situ. The broad surface of the Pier, forming a wharf-pavement, is formed in the same manner, and has a granite cope running along the inner edge. This Pier was laid upon the sandy bottom, or foreshore, a trench of varying depth having been previously excavated and levelled for the reception of the blocks. Quite close to the site of the works, upon the beach, excellent material for concrete work is available, the blocks and concrete in situ, which the Contractor has already carried out, by taking every advantage of this material, are very good specimens of their kind.

4. To understand the conditions (which are locally very well understood) which must be borne in mind in designing such a work it is necessary to refer to some of the peculiar characteristics of the fine shifting sands along the foreshore, and which surround the entrance to the Port at Arklow. This fine sand exists in a layer overlaying a bed of strong marl, which in the offing is met at a depth of from four to five fathoms, where it affords most reliable anchorage ground for ships. This fine sand is subject to considerable variations of level, to the extent of over ten feet, at a short distance from the shore. It is observed that a continuance of easterly winds has the effect of excavating the foreshore and deepening the Bar to the river, while when the winds are blowing from the land the tendency is for the foreshore to become shallow and the Bar to silt up.

5. It has been stated to me that, at the time the Board of Works were engaged in taking soundings for the purpose of preparing the plans for the present Works, the influences which cause the beach to shallow were in operation, so that the line representing the level of the bottom of the sea shown upon these plans is higher than it would be at other times when the excavating influences exist.

6. The Contract Plans, however, required the blocks to be laid several feet beneath the line of the sea bottom shown, but it would appear that the lowest depth for the foundations, delineated upon the Plans, did not nearly approach the depression of surface which occurs owing to the excavating influences when easterly winds prevail.

7. During the construction of the first sections of the work, it has been stated to me, the condition of the weather was such as to form no great variation of level, but towards the close of last year, and during the early months of this year, with a con-

* Appendix No. 1, see p. 18.

† Appendix No. 2, see p. 19.

tinuation of winds from an easterly direction, the foreshore was excavated, and a great gulf swept away along the front toe of the Breakwater, it has been stated to me, to a depth of fully ten feet beneath the level of the surface as it previously stood. It should, however, be understood that, from the fluctuating character of the level of the sea bottom, I have no doubt that the soundings taken by the Board of Works, between the 14th and 16th of March last, when Mr. Keating found a trench, forty to fifty feet wide, of an average depth of about six feet under the previous level of the bed of the sea, are correct as to the extent of the excavation existing at that time.

8. It should be understood that the security of the Pier, resting upon its dangerous foundations, was liable to be assailed from two causes, first, the general variation of level of the bed of the sea itself influenced by weather in the manner I have explained, and, secondly, from the local and more immediate undermining action of the waves oscillating against the exposed face of the Pier itself, inducing currents enough to move far more stable sand than that upon which the blocks rested. These two causes combined to form the great trench into which the lower course of blocks fell, followed by those overlaying them, and the destruction of the structure of the upper portions of the work.

9. I have, in Appendix No. 3, shown a section of the Pier at a point corresponding with the section shown in Appendix No. 2,* and which approximately illustrates the nature of the damage that has been done. Mr. Manning reports that he gave immediate orders for a shoaling course of heavy blocks to be deposited, but owing to unfavourable weather very few blocks could be laid, so that in order to save the works, which at that time continued to subside, he states that he ordered rubble to be deposited in the trench for the entire length of the injured part. I examined the material which is now being placed in the hearting between the inner and outer walls, and which was explained to me as corresponding exactly in quality with that deposited on the outside for the safety of the work, and I could not say that it is correct to describe it as rubble. In appearance it is of the character of quarry waste composed chiefly of shingle stones, about the size of road metalling with an occasional stone of a few hundredweight throughout it, this material, little better than debris, was thrown over the wall to form a shoeing, and when laid could be seen above the surface at low water, however, the greater portion of it must have since been washed away, as none of it appears over the surface now, and I found upon sounding at the toe of the wall, a deep wide trench, into which the structure in its existing shattered condition, may at any time fall if provoked by heavy storms. I may mention that at a short distance from where this material was obtained, some of the finest granite, in an open quarry, is available, which could be taken out in blocks of any size, and would afford most satisfactory rubble for such a purpose.

10. From the soundings I took of the level of the bottom immediately in advance of the point to which the work has now been carried, the sea bottom has become excavated, from the causes I have mentioned, several feet below the level shown upon the Contract Plans at which the concrete blocks were to be founded, and I found by sounding, between the timber staging, that a considerable quantity of material, of the objectionable quality I have referred to, had been deposited, which it appears has been thrown into the cavity for the purpose of raising the sea bottom, and forming the foundations upon which the lower concrete blocks will, in the continuation of the Works, be bedded. In my opinion this is a most hazardous proceeding, and calculated to commit the future destruction of the rest of the work.

11. Referring to Appendix No. 3,† I found that about 100 feet of the storm wall hearting and pavement has been more or less seriously damaged in the manner I have illustrated, the toe blocks have slipped out of the position in which they were placed, owing to the sand, upon which they rested, being washed away, followed by the blocks behind and over them, then by the loss of a considerable portion of the small filling material supporting the surface of the Pier, which caused the concrete wharf pavement to fracture in all directions. Curiously the parapet forming the upper portion of the storm wall, built of concrete *in situ* (which you will recollect was the system we adopted for the whole of the Works at the Wicklow Breakwater) has sustained the least injury, it is however, greatly displaced and fractured, and I found a portion of the inside had subsided $2\frac{1}{2}$ feet.

12. I observe Mr. Manning estimates that a sum of £1,500, will be required to make good the damage and provide additional works for the protection of the remainder of the Pier over and above the moneys already provided; £1,500, would be wholly

* Appendix No. 3, see p. 19.

† Appendix No. 3, see p. 20.

inadequate in my opinion to repair the damage and strengthen the rest of the works, therefore, I presume the Board of Works have in hands a considerable sum to supplement this £1,500, between what they are already committed to to pay the Contractor and the £30,000 provided for the works. It appears to me that any patching up of the damaged portion, no matter how carefully carried out, could not be expected to restore the work in strength and permanence, and that the whole of this part ought to be reconstructed, and carried down in solid work to a much greater depth. The fractured portions of the concrete blocks and concrete *in situ* could usefully be deposited in the trench along the front of the storm wall, to afford protection to it when reconstructed, to resist the attacks of future storms. In addition to this, the remainder of the work which will be most exposed to high seas should be laid at a much greater depth than what is shown on the Plans and not founded on loose unreliable material lifting the sea bottom up. A proper regard to the dangerous character of the fine sand should teach the lesson that the solid work ought to be carried down well below the surface to a point where it is not likely to be undermined, and bring about a repetition of the fearful state of destruction in which a great part of the present storm wall exists. This damage has not been caused by storms of any exceptional severity, and should they arise before the foundations to the work have been strengthened in a thorough manner there would be little hope, but that the Breakwater in its present weak state would be breached in such a way as to render the cost of making good the injuries a much more serious matter, so that not a moment should be lost in making proper and substantial repairs.

13. I made soundings round the edge of the staging, and believe there already exists a marked indication of the sand to follow out the Breakwater as feared by many of the local people. Just at the point close to the end of the staging, in the line of the entrance to the Port, I found that a sand bank was accumulating. It was stated to me there was frequently a depth of 18 feet of water at this place, but I found it had shallowed so as to leave only about 9 feet depth of water over it now.

I am, sir, your obedient servant,

W. G. STRYPE.

Wicklow, May 12th, 1885.

VII.—LETTER from the LOCAL COMMITTEE to the TREASURY.

Arklow, 12th April, 1885.

Sir—I am directed by the local committee assembled here to represent the local wishes as regards the new works being carried on at the harbour, to communicate with you respecting their present condition, and what they understand has been proposed in connection with them.

The construction of the works now in progress were authorized by the Arklow Harbour Act, 1882, to be carried out under the direction of the Board of Public Works, Ireland, who exercised all the powers of a local Harbour Board and were solely responsible for the design and proper execution of the work. £35,000 was provided for the purpose of the work and purchase of the interest in the harbour (£5,000 being paid to the Wicklow Copper Mine Co. for their rights). The Treasury gave the free grant of £15,000 and a loan of £20,000 which was guaranteed by the baronies of Arklow and Ballinacor, South, in the County of Wicklow, and of Gorey, in the County of Wexford.

£30,000 became available, therefore, for the construction of the Works and their superintendence, and about August, 1882, the Board of Works accepted the tender of Mr. K. MacDonald for the Works, which were to have been completed on or before 31st May, 1883.

The progress, however, was slow, and less than two-thirds of the deep-water portion of one of the piers only was laid, when in January, 1883, a great length of it was seriously damaged owing to the foundations being swept away for a considerable distance in front of the outer or storm wall.

The Chief Engineer of the Board of Works reported to the Treasury, 15th April, 1885, upon the state of the damage, and estimated that a further outlay to the extent of £1,500 would be required. Not being satisfied that the state of the case had been sufficiently represented to the Treasury the local committee instructed Mr. W. G. Strype, c.x., who had carried out the Works at Wicklow Harbour, to report to them, which he did in

May, 1885. The Board of Works then proceeded to repair the damage in a great measure in the manner suggested in Mr. Strype's report.

Meanwhile the local committee, being very anxious that a full inquiry should be made into the whole case, with the assistance of Mr. W. J. Corbet, M.P., at last succeeded in getting the Treasury to agree to appoint an engineer to visit the locality and report upon the case, and subsequently Messrs. Thomas Stevenson and Bindon Blood Stoney, Civil Engineers, visited Arklow in September last, but as no sufficient intimation was locally received it was not possible for the local committee to organise any movement to get a full representation of the case laid before these gentlemen.

Messrs. Stevenson and Stoney's report is dated 8th January last, and has just been issued, and contains suggestions which the local committee consider to be unsatisfactory, so they again employed Mr. Strype to report to them in order that they might make a further representation to the Treasury on the subject.

I am accordingly directed by the committee to send you herewith Mr. Strype's report* which has been unanimously adopted by the committee, and embodies all the views of the people in the town who have had long experience of the subject.

What the committee fear is that owing to the original errors in the design, and the great delay that has taken place in the progress of the work, that the further outlay involved to complete the work and make good the defects will exceed the moneys already provided. The committee consider, and they feel confident their views are shared by the guaranteeing baronies and all who are interested in the work, that the guarantors cannot be expected to be held responsible for any further payments, at the same time they consider that a bold and determined course should be fixed upon to grapple with the defects, and ensure the work being completed in a sound way, and with fair expedition. They feel somewhat surprised that in the face of the damage that took place in January and February of last year, the admission of which was so fully admitted in the report of the Chief Engineer of the Board of Works, should have been so lightly regarded by the easy way in which Messrs. Stevenson and Stoney have treated the subject.

The committee do hope that the Treasury will take immediate steps to have this work properly dealt with. The operations are now practically at a standstill, while the best time of the year for carrying on such work is approaching, and no definite plan seems yet to have been decided upon.

Nothing could be more unsatisfactory than this state of affairs. The continued anxiety and disappointment of the people of Arklow, especially those whose livelihood depends upon the security of the port, is very great, so that the Committee trust in making this appeal to the Treasury it will be attended with the result they so deeply desire, that of making Arklow Harbour a strong and safe port—not inferior in any way to what was represented to them when they and the neighbouring baronies were required to accept the responsibility of guaranteeing the cost of the loan.

I remain, sir, your obedient servant,

HENRY BYRNE,

Hon. Sec. Local Harbour Committee.

H. H. FOWLER, Esq., Financial Secretary to
the Treasury, Whitehall, London.

VIII.—ARKLOW HARBOUR WORKS.

Further Report by Mr. W. G. Strype, c.e., Wicklow, addressed to the Local Harbour Committee, Arklow.

GENTLEMEN,—In compliance with your instructions I have inquired into the present state of the works and considered the recent Report of Messrs. Thomas Stevenson and B. Stoney, Civil Engineers, upon Arklow Harbour, addressed to His Excellency the Lord Lieutenant of Ireland.

Since I reported to you on May 12th, 1885, shortly after the Southern Breakwater was damaged by storms, the Board of Works have caused the damage to be repaired in a workmanlike manner, and have extended the Pier by about 120 feet, considerably strengthened along the sea front. So far the repaired and strengthened works show no further indication of weakness, and there now only remains a length of about 120 feet to be constructed to carry out this Pier to the full length of 575 lineal feet as contemplated by the plans.

Messrs. Stevenson and Stoney visited the Harbour in September last (after the damages had been repaired), and as a result of their investigation they propose, among

* See No. VIII.

other things, to change the method of construction of a portion of what remains to be carried out of the Southern Breakwater, by forming it of solid concrete *in situ*, to be founded at a greater depth, in place of concrete blocks as intended by the Plans. They caused borings to be made at the Pier head and reached strong boulder clay at a depth of from 37 to 38 feet under the level of low water. This is overlaid with soft muddy sand for a depth of 14 feet, upon which rests the sea bed of sand and gravel, having a thickness of 9 feet, the lower portion of this 9 feet of thickness being compact gravel from 4 to 5 feet thick. Thus the sea-bed, where the borings were made, is some 23 feet over the marl and 14 feet under low water. They recommend the foundation, for the end portion of the Pier, should be carried into the 9 feet thick sea-bed and be laid at a depth of 21 to 22 feet under low water. In this way the foundation would be within about 2 feet of the 14 feet of soft muddy sand, separated only by a thin fragile crust described as compact gravel, which could easily be broken through, engulfing the whole of the proposed work.

Messrs. Stevenson and Stoney recommend the liberal use of heavy rubble, which they state may be obtained from the present quarry, in blocks averaging 35 cwt. each stone. I visited the quarry, and measured the large stones obtained there, but could not average them at more than 10 to 12 cwt. each, while the largest stone I could find was barely 20 cwt. From inquiries I made at the quarry, I found that to get rubble even of this size it is necessary to remove from six to eight times their volume, and it is difficult to understand why the easily obtainable and superior rubble in the quarry close by, from which Mr. Farnell is now obtaining paving sets, should not be utilised. Messrs. Stevenson and Stoney recommend a footing course should be deposited along the outside of the storm wall of the southern breakwater (averaging 25 cwt. each), for a width of forty feet, and a depth of about five feet—no doubt a judicious recommendation. They also propose to throw down similar rubble round the Pier head, and along the toe of the inner wall of the southern breakwater, from the extremity inwards for a length of about 300 feet, a width of about 30 feet, and rising to within about twelve feet of low water. In this way a reef of artificial rock is recommended to be deposited at the entrance and along the most useful and navigable portion of the Harbour. Upon reference to the Plans, it will be seen that at 300 feet from the extremity the inner wall is founded, at a depth of about ten to eleven feet below low water, while at the extreme end it is founded at about fourteen feet, so that to deposit this toe of large rubble upon the inside, having a corresponding depth of about five feet, to be placed about twelve feet below the level of low water, it would be necessary to excavate and undermine the Pier at the extreme end, to the extent of three feet, and at the point 300 feet from the extreme end to the extent of from seven to eight feet.

It appears to me that whatever objections exist to the designs of the Board of Works that to modify them as suggested in the portion of the report dealing with the matters above referred to would be entirely wrong. Since the disaster that occurred in the earlier state of the work, the Board of Works have taken better measures to strengthen the Pier, and it will be obvious, when it is not intended to go direct to the marl for a solid foundation, that in place of excavating through the sand and compact gravel, and approaching so closely to the loose, dangerous, soft muddy sand which underlies it, it would be proper to distribute the weight as far as possible by spreading it over a wide area of surface. I therefore feel quite satisfied in recommending the local Committee to oppose in every way they can the recommendations contained in Messrs. Stevenson and Stoney's Report, both as regards the alteration in the method of construction and form of the portion of the southern Pier yet to be carried out, and as regards the deposit of large rubble for a length of 300 feet along the inside of the breakwater.

There is a strong local feeling as to the undesirability of constructing the Northern Groin, the concrete blocks for which have already been prepared by the Contractor. Messrs. Stevenson and Stoney recommend that its construction should be deferred for the present. I would, however, urge the Committee to get this portion of the work deferred, and instead to employ the large concrete blocks prepared for it, in extending the Southern Breakwater by about 200 feet, and so afford a better covering to the entrance to the Port. There is a considerable run in the river during storms ranging from East to North at present, which would be greatly relieved by this extension, and it is clear that by lengthening the Pier the danger of the fine sand following out the works and silting up the Harbour would be rendered more remote.

I remain, Gentlemen,
Your obedient Servant,

W. G. STEPHENSON, M.Iнст.C.E.

Wicklow, March 30th, 1886.

IX.—MEMORIAL of the SHIPOWNERS, MERCHANTS, and TRADERS of ARKLOW, to
Mr. ROBERT MANNING, Engineer to the Board of Public Works, Ireland.

Arklow, Co. Wicklow.

31st March, 1886.

The MEMORIAL of the SHIPOWNERS, MERCHANTS, and TRADERS of ARKLOW,
SHOWETH :—

That a movement is on foot amongst the boatowners of this place (who have hitherto paid no dues towards the maintenance of the harbour) to induce the Government to alter your plan for the improvement of the said harbour, which plan the contractor is very successfully carrying out.

They have also employed a local engineer to report on their idea of the change that should be made, viz:—To abolish the north groin, and apply the amount saved thereby to a further extension of the south pier only.

To this change of plan we beg to offer our most strenuous opposition for the following reasons:—

FIRST.—That the shifting sand, and the deposit carried down by the river have always ruined our harbour by silting it up, and the only effectual remedy for this has hitherto been the scour of the river, especially when the current was increased by the mountain freshets. To assist this scouring power has been the great aim of former engineers, as evidenced by the weirs made in different parts of the river to narrow its area and increase its influence, and yet, strange to say, contrary to all precedent—to your plan, and the approval of Messrs. Stoney and Stevenson, Civil Engineers, the few people in question want to reverse all that—to have a single pier run out—to lose sight of the confining influence of the second pier, and, of course, ignore the utility of the current in keeping the bar and harbour clear of sand and deposit. If this change of plan is conceded, the first inevitable result must be that when the river comes to the termination of the old north pier, which will be, say 600 feet shorter than the extended south pier, the water must of necessity break off around the shorter pier—the scouring power be lost, and the shifting sand and deposit allowed to accumulate against the south pier—follow it out to its termination, and in a very short time render it utterly useless as a breakwater, and eventually become similar to and a part of the ordinary seashore. This anticipation has in some degree been already realised, as the extension of the south pier has now been going on for the past eighteen months, and is at present out about 530 feet, and yet for the want of a proportionate increase in the north pier, and of course, the loss of the scour of the river, the depth of water has not at all increased within the last eight months, although we have had as great a freshet in the river as has been seen for several years.

Our next objection to the proposed change is:—That with the south pier run out as a breakwater only, the harbour would be open for, say, eight points of the compass, and so utterly devoid of shelter that with the wind from N.E. to S.E., no vessel could be held in any of the discharging berths, with even a medium run of the sea. This fact was most conclusively proved during the late moderate gales, when even with the present extension of the south pier (the north being still in its original form), the run was so tremendously increased that the mooring posts which had stood for very many years were rendered completely worthless.

Thus two of the main objects of the harbour, viz.:—Depth of water and safety of the craft inside, would be entirely lost sight of, the anticipated harbour degenerate into a place of resort for a few fishing boats, and the hopes held out to the Baronial Guarantors be ruthlessly dissipated, as they were led to believe both by the publication of pamphlets and personal canvas that the risk they undertook was merely nominal, the harbour in its improved state being sure to be self supporting, and also able to pay off fitting it for a port-of-call for steamers, and to admit a class of large sized sailing vessels.

Memorialists, therefore, pray that when a reference is made to you from the House of Commons or elsewhere, you will in the interest of all concerned, and in justice to

To face p 46

X PLAN

— ARKLOW HARBOUR. —



Plan suggested by local Committee 1882 coloured Red
Board of Works Plan, coloured yellow

Scale 6 inches to a mile

the Guarantors who were instrumental in getting the grant and loan, adhere to your original plan, and if any slight change is made—instead of abolishing the north groin—raise it about two feet higher, and insert a few posts or rings in the concrete to allow vessels to make fast to, should they through scant wind fall against the south pier.

And memorialists as in duty bound shall be for ever grateful.

(Signed),

KEAROS & TYRELL, Merchants and Ship Owners, Arklow.

JOHN STOREY, Ship Owner, Ferrybank, Arklow.

JOHN MARSHALL, Ship Owner, Ferrybank, Arklow.

GEORGE SHERWOOD, Ship Owner, Arklow.

JOHN HALL, Ship Owner, Arklow.

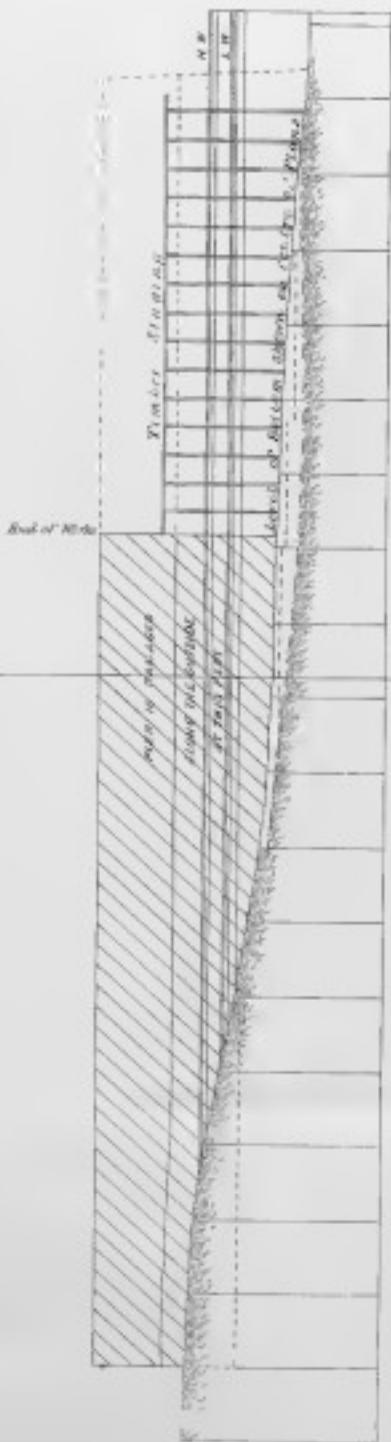
HENRY KEAROS, Ship Owner, Arklow.

And twenty others.

To Robert Manning, Esq., C.E.,
H. M.S. Board of Works,
Custom House, Dublin.

LONGITUDINAL SECTION OF SOUTH PIER.

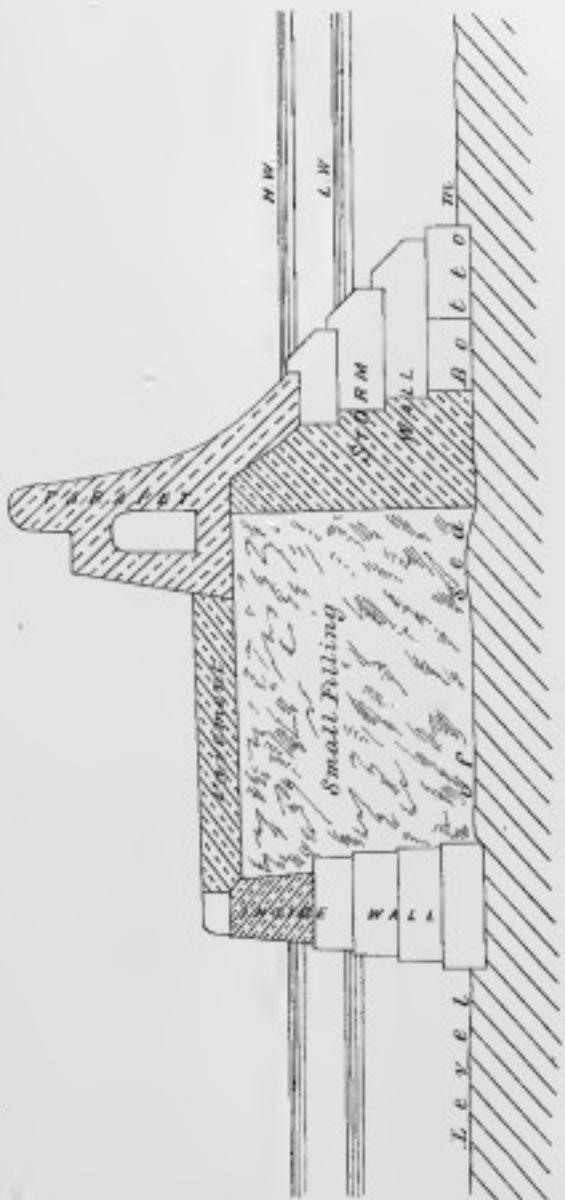
APPENDIX N^o.



B
Point of main stone - - - - - Shows level of foundation of pier
do - - - - - do where sand has been removed
and by the action of the sea

APPENDIX N^o 2.

SECTION THRO PIER AT LINE A.B.



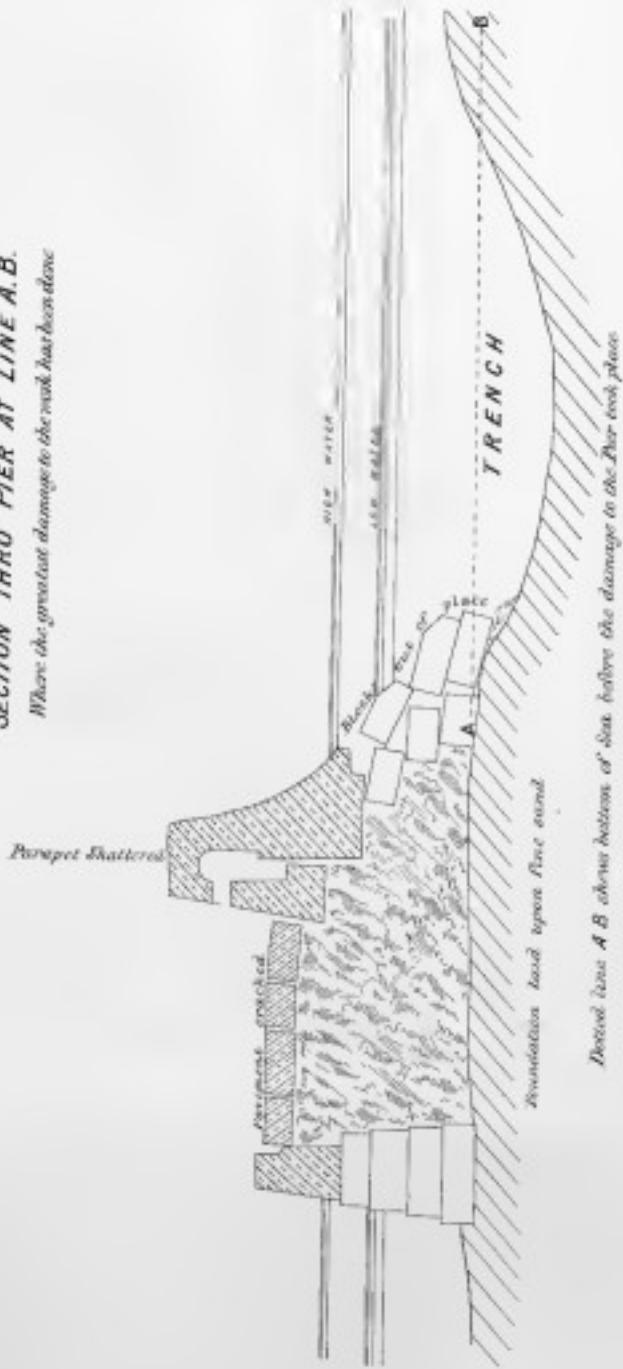
Portions marked thus were to be constructed
as Concrete in situ.

Blocks are shown without section across lines

APPENDIX N° 3.

SECTION THRO PIER AT LINE A.B.

Where the greatest damage to the rock has been done



Dashed line A-B shows bottom of sea before the damage to the Pier took place.

